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North Sea case study content and process design report

How to achieve sustainable water ecosystems management
connecting research, people and policy makers in Europe (AWARE)

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Author(s) Josette Garnier, Paul Passy, Gilles Billen (UPMC) Christiane, Lancelot, Véronique Rousseau, Nathalie Gypens (ULB)	
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PART I: NORTH SEA-3S CASE STUDY

1. Executive summary/abstract

A deep knowledge of the 3 watersheds of the Seine, Somme, Scheldt and their adjacent coastal zone of the eastern Channel and Southern North Sea (North Sea -3S case study) has been gathered in the past decades allowing to model the aquatic continuum from land to sea, to reconstruct the ecological and biogeochemical state from the 1950's and to construct scenarios for the future, at various horizons (short term: 2015; mid term: 2030; long term: 2050). In the framework of the AWARE project, because we demonstrated that the implementation of the Water Framework Directive will not be able to reduce nitrogen enough to overcome ecological problems, an integrative approach including citizens-stakeholders-scientists is necessary as the measures to be taken are more systemic.

2. Case study content

2.1. Key policy, socio-economic and research questions to be addressed

One key problem in the North Sea Case study is the eutrophication of the coastal zone of the eastern Channel and Southern North Sea, where harmful algal blooms are occurring every year. This situation is neither compatible with the "good ecological status of water" as defined by the European Water Framework Directive (WFD) nor with targets set by the OSPAR Commission for the coastal area of concern.

Over the 3 drainage networks (Seine, Somme, Scheldt) which deliver an excessive load of nitrate to the coastal zone, there are many stakeholders with different points of view on the question of water quality. This situation sometimes leads to conflicts. As an example, the Belgian coast is a great tourist attraction for both Belgian and foreign visitors. About 30 million people visit this coast every year. To satisfy these visitors and to keep this area attractive, the quality of coastal water should be good. At the French coastal zone, toxic algae are damage for shellfish, so that their selling is regularly forbidden. Within the watersheds, whereas the EU-WFD has led to decrease the excess loads in phosphorus and organic matter in waste water treatment plant, nitrogen remains a problem as it originates principally from agriculture and not from domestic wastewaters. The problems of pollution by agriculture (fertilizers,

pesticides) are not a specific point of the WFD and are therefore often avoided by managers and politics.

The main problem is the eutrophication of the coastal zone due to the excess of nitrates delivered by the rivers of the 3 watersheds. The challenge is to reduce the import of nitrates from the watershed into the sea. Different management scenarios can be assessed with a chain of mathematical models.

2.2. Available data and scientific knowledge

Since the last 20 years, several studies have been conducted on the case study, firstly on the coastal zone and the watersheds separately, exactly as were organised the administrative services who financially supported the scientific projects at regional, national and European scales. The PIREN-Seine programme on the Seine River has started in 1989 but studies linking the watershed and its coastal zone began with the Liteau programme in the early 2000's. In parallel, many studies where conducted focusing on the coastal zones, in Belgium as a federal science support for a sustainable North Sea, in France by IFREMER (Cugier et al., 2004) especially and in the framework of EU programmes of DG Recherche and DG Environment (Garnier et al., 2009). It is through programmes which started around 2005 (Liteau and Thresholds, Timothy and PIREN-Seine) that a link could be developed between the functioning of the watershed, extending over about 100000 km^2 and their adjacent coastal zone, based on i*n situ* observations, experimental work conducted in laboratory and deterministic modelling of the biogeochemical functioning of the aquatic continuum, from land to sea. It gathers several scientific teams and public or private institutions on the field of water management.

Thanks to these different projects, we have been able to assemble data bases, on the hydrology, meteorology, geomorphology, wastewater effluents inputs, land use, and water quality data to validate the model simulations. Whereas the data concern a ten year period, up to the warmest year 2003, it remains difficult to obtain data for the recent years. The few recent data available show however a marked decrease in phosphorus loading, while nitrogen load remains at a high level.

2.3. Specific modelling and/or assessment tools

2.3.1. Description

The functioning of the 3S and adjacent coastal zone system is described based on coupled watershed and coastal models.

The RIVERSTRAHLER model (Billen et al., 1994; Garnier et al., 1995; 2002; Billen and Garnier, 2000; Garnier and Billen, 2002) describes the drainage network of any river system as a combination of basins, represented as a regular scheme of confluence of tributaries of increasing stream order, each characterized by mean morphologic properties, connected to branches, represented with a higher spatial resolution. The advantage of this representation of the drainage network is that it takes into account, with reasonable calculation time, both the processes occurring in small first orders (i.e., headwater streams) and those occurring in large tributaries. The water flows in the hydrographical network are calculated from the specific discharges generated within the watershed of the different sub-basins and branches considered. Specific discharges are calculated from rainfall and potential evapotranspiration by a simple two-compartment rainfall-discharge model that distinguishes two components: surface, or sub-root (hypodermic) runoff, and groundwater, base flow.

The essence of the model is to couple these water flows that are routed through the defined structure of basins and branches, with a model describing biological, microbiological, and physicochemical processes that occur within the water bodies. The module representing the kinetics of the processes is known as the Rive Model. The state variables comprise nutrients, oxygen, suspended matter, dissolved and particulate nonliving organic carbon, and algal, bacterial, and zooplanktonic biomasses. Most processes important in the transformation, elimination, and/or immobilization of nutrients during their transfer within the network of rivers and streams are explicitly calculated, including algal primary production, aerobic and anaerobic organic matter degradation by planktonic as well as benthic bacteria with coupled oxidant consumption and nutrient remineralization, nitrification and

denitrification, and phosphate reversible adsorption onto suspended matter and subsequent sedimentation. Garnier et al. (2002) provides a detailed description of the Rive Model and of the physiological parameters used. Besides morphological and climatic constraints, the Riverstrahler takes into account diffuse and point sources of nutrients from land-based anthropogenic sources. Diffuse sources of nutrients through surface and groundwater respectively are assigned a constant concentration for all nutrients. Point sources, which are typically wastewater discharges, must be specified by stream-order for the basins and at their exact location for the branches.

MIRO is a also a mechanistic biogeochemical model describing, N, P and Si cycling through aggregated components of the planktonic and benthic realms of coastal ecosystems dominated by Phaeocystis, an undesirable flagellate (Lancelot et al., 2005; Lancelot et al., 2007). Its structure includes thirty-eight state variables assembled in four modules describing the dynamics of phytoplankton (diatoms, nanoflagellates and Phaeocystis), zooplankton (copepods and microzooplankton), dissolved and particulate organic matter (each with two classes of biodegradability) degradation and nutrients (NO3, NH4, PO4 and Si(OH)4) regeneration by bacteria in the water column and the sediment. Equations and parameters were formulated based on current knowledge on the kinetics and the factors controlling the main auto- and heterotrophic processes involved in the functioning of the coastal marine ecosystem. The MIRO model is implemented in a multi-box frame delineated on the basis of the hydrological regime and river inputs. In order to take into account the cumulated nutrient enrichment of Atlantic waters by the Seine, Somme and Scheldt rivers, successive boxes, assumed to be homogeneous, have been chosen from the Seine Bight to the BCZ. Each box has its own morphological characteristics (see Lancelot et al., 2005) and is treated as an open system, receiving waters from the upward adjacent box and exporting water to the downward box. MIRO was first calibrated for 1989–1999 climatic conditions of river loads, global solar radiation and temperature calculated from available data and its prediction capability was demonstrated by its ability to reproduce the SW–NE nutrient enrichment gradient observed from the Western Channel to the Belgian Coastal Zone as well as the mean seasonal nutrient and ecological features recorded in the central BCZ during the last decade (Lancelot

et al., 2005). As a step further, MIRO has been coupled to SENREQUE-RIVERSTRAHLER (SR-MIRO model, Fig.1) and is now constrained by simulated nutrients loads (Lancelot et al., 2007).

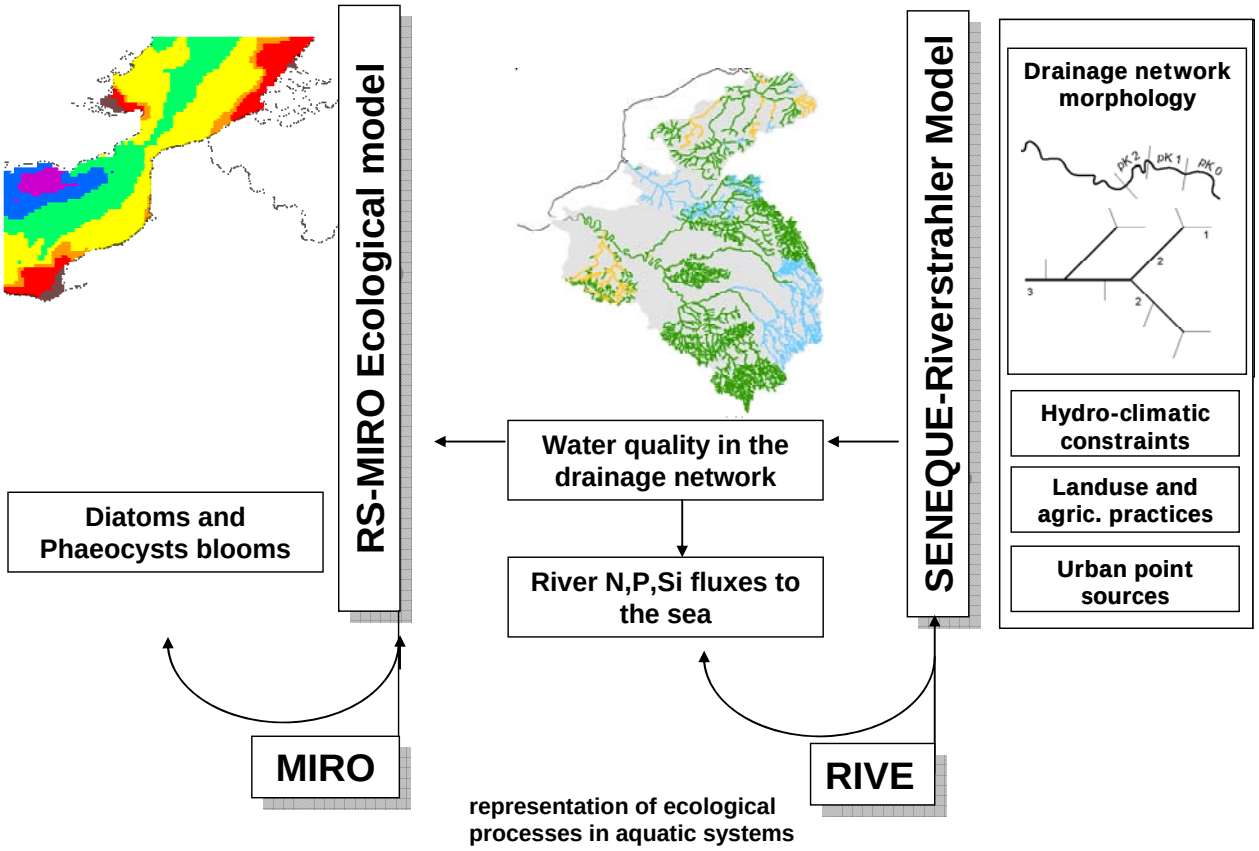

Fig. 1*: Schematic representation of the coupled model of the 3S and adjacent coastal zone (MIRO and Seneque/Riverstrahler)*

Finally nowadays, the main problem is the excess of nitrogen regarding phosphorous and silica. Since phosphorus is well treated in waste water treatment plant, this nutrient is not a problem for eutrophication any more. It's more difficult to reduce the income of nitrogen, because it comes from agricultural diffuse sources.

2.3.2. Assumptions and approach

MIRO and Seneque/Riverstrahler are both deterministic biogeochemical models. It means the processes are simulated on the base of experiences conducted on laboratory separately from the data involved in the validation of the models.

It is also important to mention that once the kinetics of any process has been formulated, and the parameters determined, the same models of ecological/biogeochemical processes is used. This is true for both models which are conceptually very similar. The concept of unicity of the processes is a strong issue of our approach.

2.3.3. System boundaries and scales

The whole case study covers the Seine, Somme and Scheldt watersheds, and the coastal zone of the eastern Channel and the Southern North Sea. As mentioned above, the model Seneque/Riverstrahler is able to model the water quality at any point of watersheds and especially at the outlet of the basin; the files provided by the latter are one of the limit conditions of the MIRO model which together with boundaries from the marine system simulate the water quality of the marine coastal system in terms of nutrients and biomass of key functional phytoplankton (diatoms *versus* non-diatoms). Note that Seneque/Riverstrahler model can be implemented on a single sub-watershed (from 10 km^2 to a whole river system).

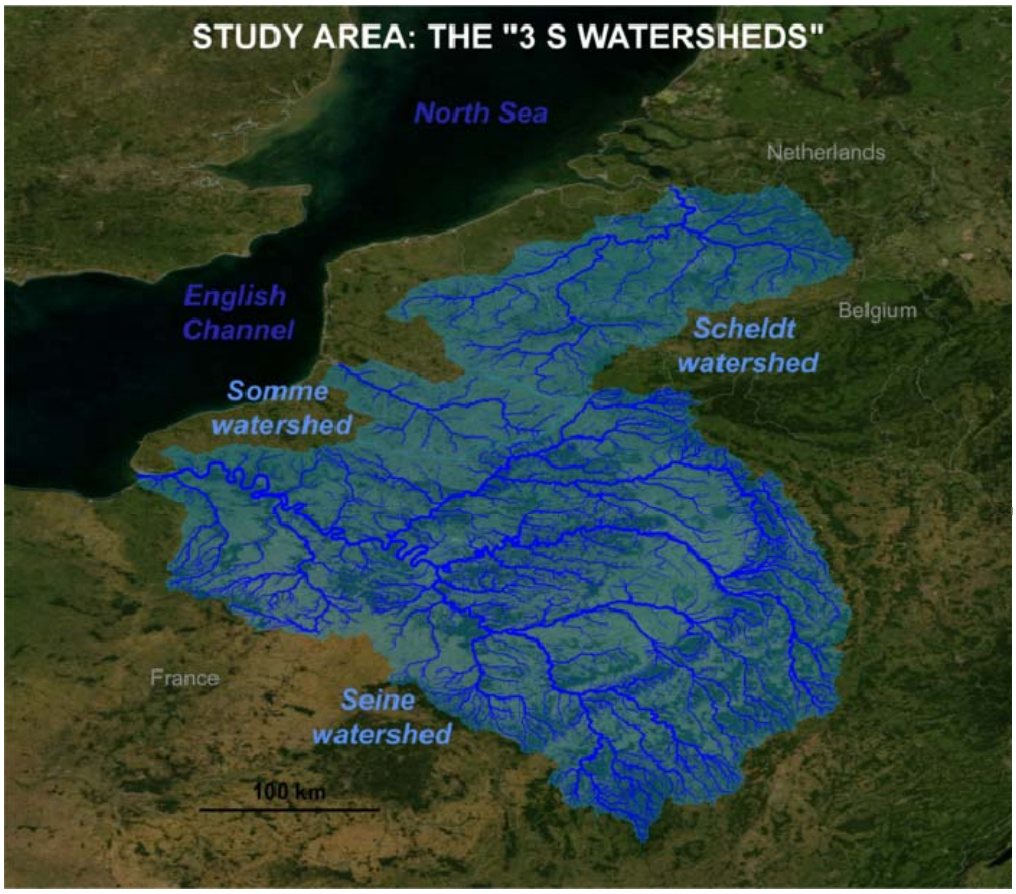

Fig. 2*:Location of the study area*

2.3.3. Previous scenario-building exercises

Some scenarios testing nutrient reduction measures have been already implemented making use of the SR-MIRO tool (Lancelot et al., 2010). As an example, thanks to the Seneque/Riverstrahler model, we simulated two different futures for the agriculture in the three watersheds. We modelled the impacts on water quality of generalization of the “Good Agricultural Practices” and of “Organic Farming” (Fig. 2, Thieu, 2009; et al., 2010) in comparison with “Business As Usual” (the situation if we continue as today). In the case of “good agricultural practices”, the situation strives to improve immediately, but effects are not as efficient as expected. Indeed, where rivers were of “very poor” quality, there gains a “medium” quality. Only very few rivers far upstream present a “good” status. The situation is much better with the generalization of the “organic

farming". The great majority of the rivers obtains a "good" or a "very good" status. This "organic farming" scenario is the only one to achieve the "good quality" status in the downstream part of the three rivers (Fig. 2). But about one century is required to obtain a river network with the quality of the beginning of the 20th century. This situation propagated in the coastal area with the best Phaeocystis reductions obtained after implementing either good agricultural practices or organic farming in addition to WWT (Fig.2)

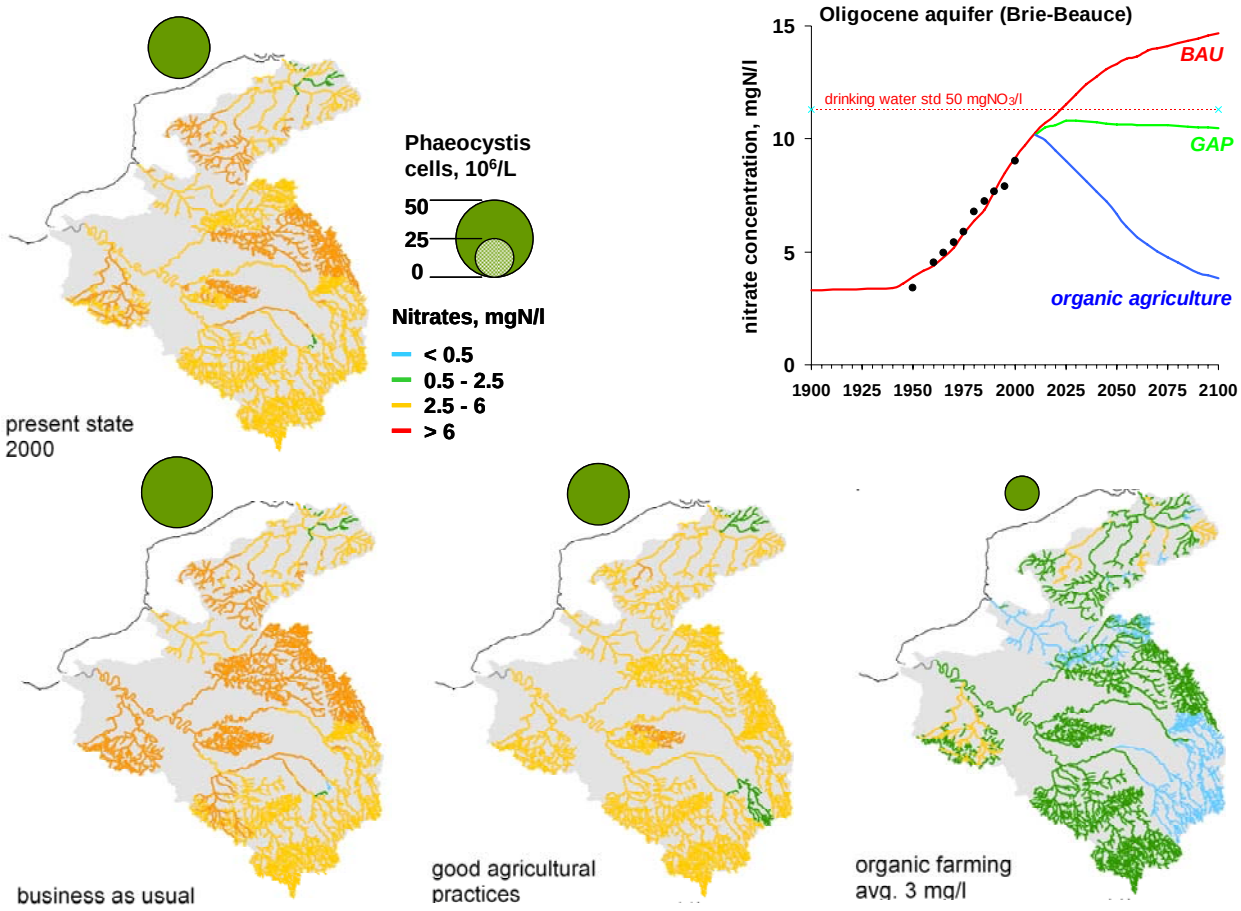

Fig. 2*. Distribution of yearly mean concentration of nitrogen over the three drainage networks, as calculated by the Riverstrahler model, for different scenarios (Present state in the beginning of 2000's, business as usual (politics are continued), good agricultural practices (use of winter catch crop and reduction of fertilizers), organic farming (use of organic fertilizers from breeding animals, and not chemical fertilizers). Adapted from Thieu 2010 and Lancelot et al., 2010.*

2.4. State-of-the art information to be provided to participants

The area considered is characterized by a large variety of administrative and management authorities (Fig. 3). The first level is that of the Hydrological District, as defined by the EC WFD. In France, two Water Agencies are responsible for water resources management at that level: the Seine-Normandie Water Agency and the Artois-Picardie Water Agency. The latter, responsible for the Somme basin, is involved, with the Walloon, Flemish and Brussels Region in the management of the International Scheldt Water District, in the scope of the International Scheldt Commission (ISC). All these Institutions have developed, in line with the prescription of the European WFD, a general Development Scheme for Water Management (SDAGE) as well as more local measure programs, in order to achieve the objectives of the water directive. Both in Belgium and in France administrative Regions are closely associated to the water management policy.
The second level is the protection of the marine waters in compliance with the OSPAR commission and the EU Directive on Marine Strategy (2008/56/EC). In Belgium the Federal State is responsible for coastal water quality in the economic exclusive zone.

Because of its large size, the North Sea Case study presents many activities. Within the watersheds, human activities are dominated by agriculture. Cereal crop predominates in the Seine and Somme watersheds, while livestock farming predominates in the Scheldt watershed. There is also an important industrial activity near the agglomeration as Paris, Le Havre or Brussels. As we already mentioned, tourism is a major economical activity of the coastal zone, especially in Belgium. Finally, shellfish farming is also a crucial activity both in the French coastal zone and in the Belgian offsore one.

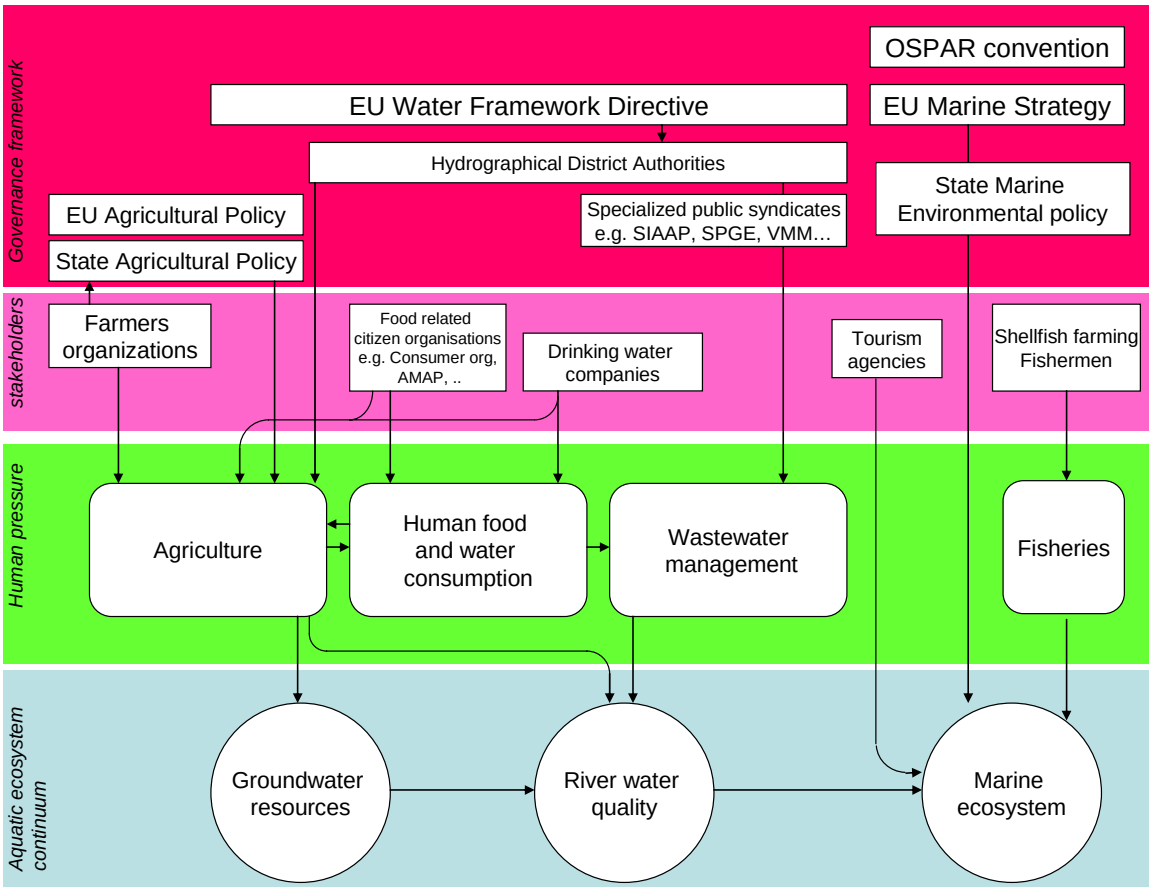

Fig. 3: *Policy and legislative framework and socio-economic concerns of the North Sea Case study*

Long term modelling work aiming at reconstructing the past situation of Phaeocystis blooms in the Southern North Sea has shown that these blooms were not significant under pristine conditions. Yet Phaeocystis blooms were already reported at the turn of the 19th century, but have increased in duration and intensity from the years 1950's on (Cadée and Hegeman, 1991.; Lancelot et al., 2007). The nutrient delivery by the Seine and the Scheldt is well monitored since about 30 years (Fig. 4). For phosphorus and nitrogen, these are ten to fifty times higher than the pristine levels. These data show (i) a regular increase of nitrogen fluxes, also influenced by the pluri-annual cycle of water discharge variations, (ii) a regular decrease of phosphate delivery, owing to the reduction of polyphosphate in washing powder and on the recent implementation of phosphorus treatment in waste water treatment plants, (iii) no clear trend, beyond that of water discharges variations for silica.

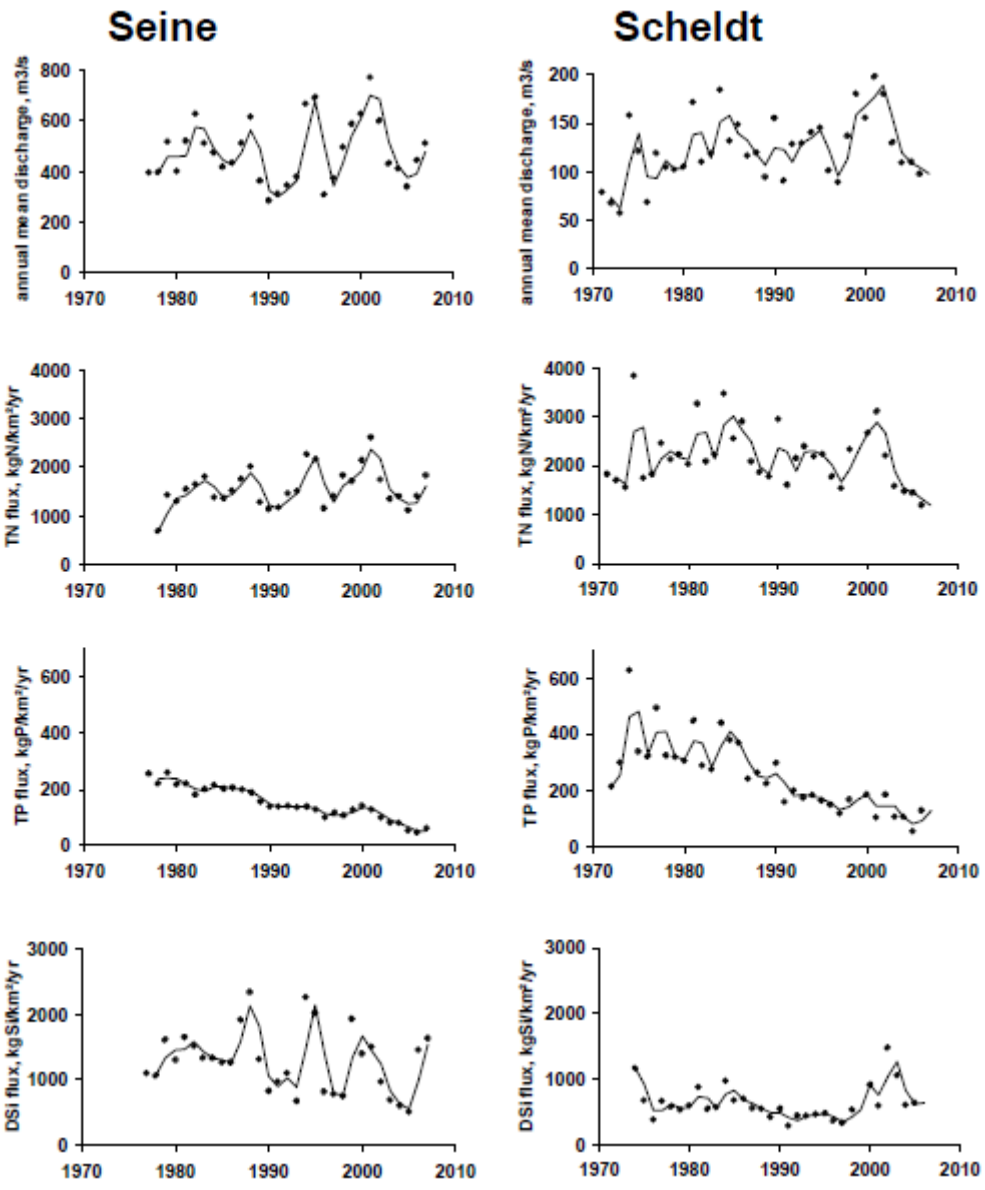

Fig. 4: T*rends in nutrient loading delivered by the Seine and Scheldt Rivers to the sea. Since 40 years, the maximum level of Phaeocystis blooms reached in the Belgian coastal zone has increased. The current trend is either to a slow increase or a levelling off. No sign of recovery are observed in spite of the marked decrease of phosphorus delivery (see Fig. 5).*

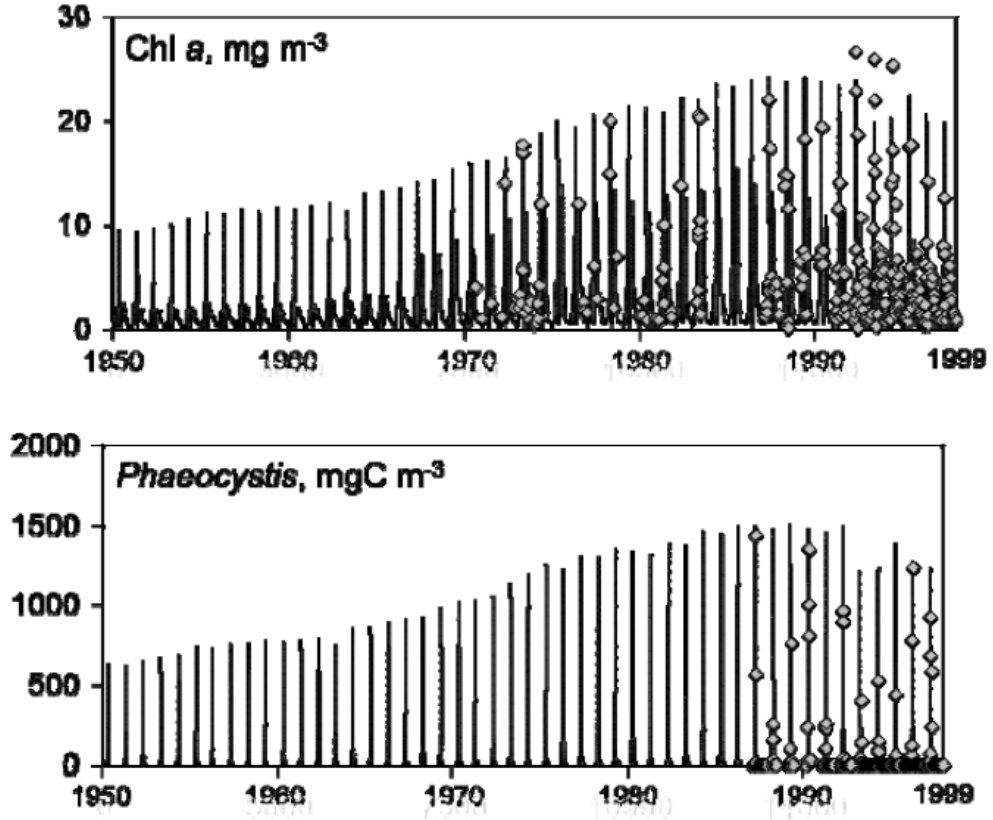

Fig. 5*: Time series of Chl<u>a</u> concentrations and Phaeocystis biomass in the Belgian coastal zone.*

By contrast, in the Seine river plume, off the Calvados coasts (Fig. 6), the occurrence of toxic Dinophysis algal blooms seems to decrease since a dozen of years but could still reach nowadays the cell threshold for toxicity i.e., 10 000 cells L^{-1}.

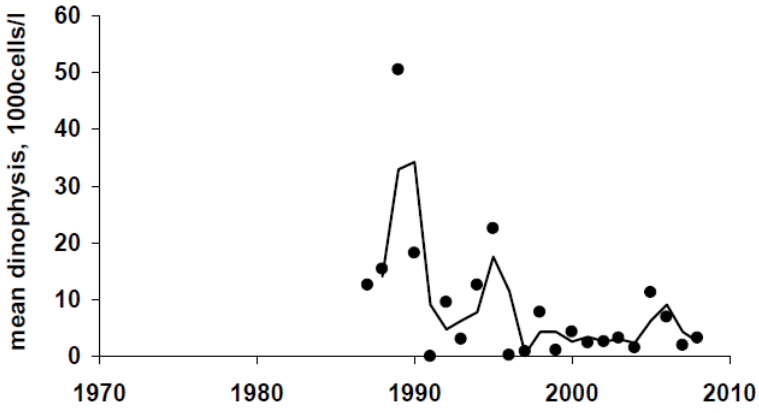

Fig. 6: *Trends in the mean Dinophysis (toxic non siliceous algae) cell numbers off Antifer in the Seine River plume.*

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PART II: CASE STUDY PROCESS

1. Introduction

The three AWARE case studies will follow a common structure, in order to ensure the coherence and comparability of the work undertaken with and by the citizens' group all along the process. This process started with the first EU level workshop – which gathered all the 30 citizens together at UPMC in Paris on 23-24 April 2010 – and will continue with the local workshops and public conferences – to be run in parallel in the three case study areas with the three sub-groups of 10 citizens from Latvia/Estonia, France/Belgium and Italy during the autumn 2010 – and finally with the second EU level workshop and final conference in the spring of 2011.

The overall process is depicted in the flow chart diagram below. In summary:

Step 1. The overall AWARE case studies process started with the First European Workshop, held in Paris on 23-24 April 2010.

Step 2. Based on the workshop conclusions, key questions concerning what is the "good ecological status" in the three areas and how to achieve it with a better connectivity between research, policy and citizens are identified.

Step 3. Key stakeholder representatives are invited to join the local case studies processes, answering to an on-line survey and (part of them) being invited to attend the local workshop.

Step 4. Stakeholders surveys are made available online and the results analyzed with the a twofold purpose: 1) to identify who among the respondents will be invited to the local workshop (whereas the local conference will be public and therefore open to all the stakeholders answering to the survey and any other); 2) to provide a summary of the survey results at the local workshop.

Step 5. Local workshops are organized according to a common framework which is further detailed below, focusing on improving the management of the coastal ecosystems with better connectivity, in particular with the involvement of the citizens.

Step 6. Face-to-face interviews are undertaken with the key policy makers for each case, with the aim to introduce them to the AWARE project and first case studies' conclusions (as emerged from the local workshop), and to gather their opinions. A part of them will be invited to intervene at the local public conference.

Step 7. Local public conference gathering the groups of 10 citizens, scientists, stakeholders and policy makers in a public debate. The aim of this conference is to present and discuss the local citizens declaration, and possibly trigger more

permanent schemes of local action to enhance the connectivity of research, policy and the public at local level.

Step 8. Drafting of the case study reports, including the local citizens declarations, which will be discussed at the Second European Citizens Workshop.

Step 9. Second European Citizens Workshop, to be held on 22-23 April 2011, with the aim to produce the overall citizens' assessment (declaration).

Step 10. Key stakeholder representatives at EU level are invited to join the overall assessment of the AWARE process, answering to an on-line survey and being invited to participate at the EU final conference.

Step 11. Stakeholders surveys are made available online and the results analyzed with the purpose to provide a summary of the results at the final conference.

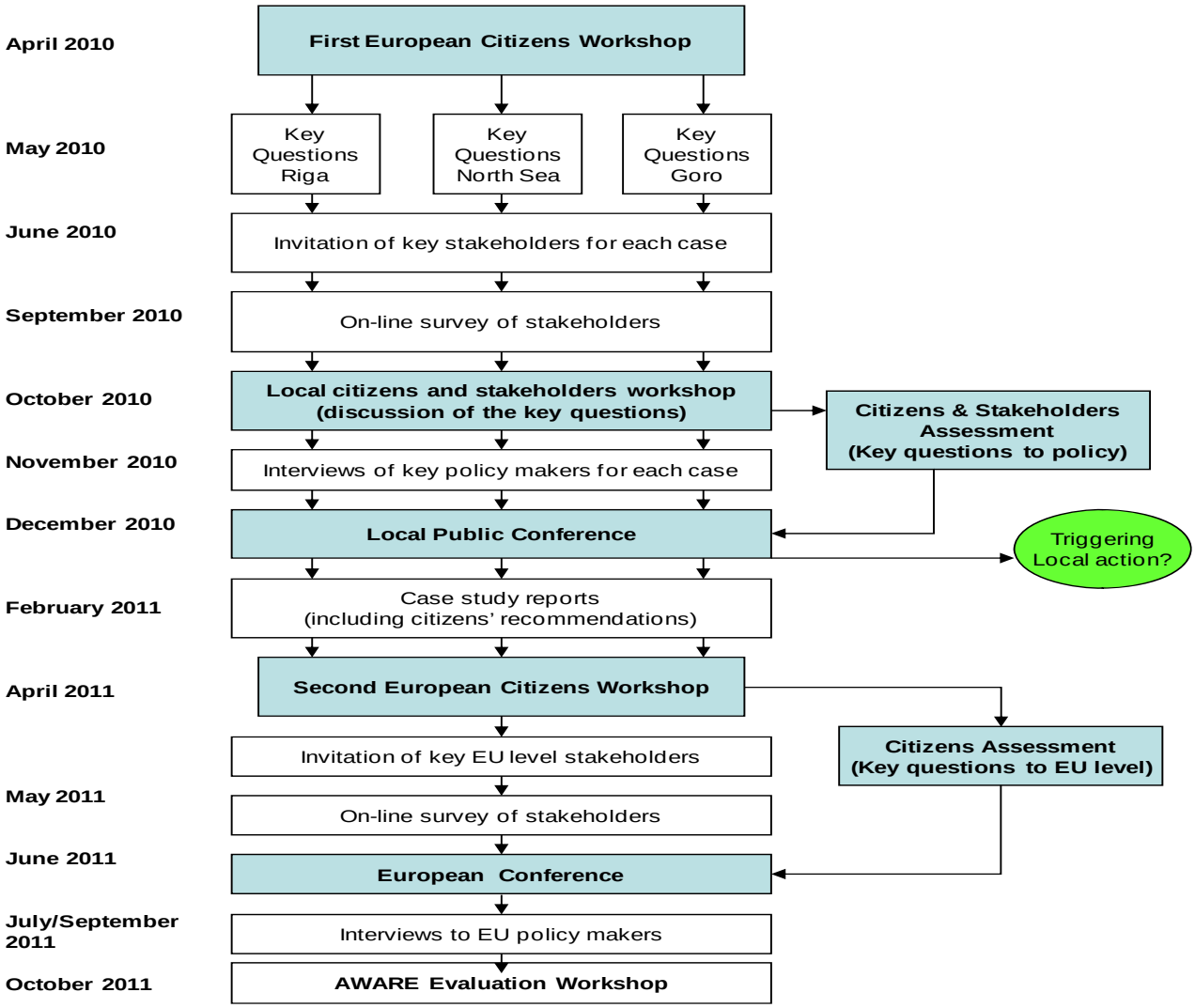
Step 12. EU final conference gathering the group of 30 citizens, scientists, stakeholders and policy makers in a public debate. The aim of this conference is to present and discuss the AWARE citizens declaration.

Step 13. Face-to-face interviews are undertaken with the key policy makers at EU level, with the aim to introduce them to the AWARE project and conclusion, and to gather their opinions. A part of them will be invited to intervene at the AWARE Evaluation Workshop, which will aim to gather also water managers at the national/regional level.

Step 14. AWARE Evaluation Workshop.

All the case studies will follow this common sequence of steps, with some minor deviations concerning the exact timing and organization of the local events to adapt to specific circumstances.

AWARE Flow Chart



The whole process is centered around the group of 10 citizens who will :

- be informed of the different facets of the problematic of coastal zone environmental management;
- discuss with stakeholders, policy makers and scientists about the ongoing measures taken or envisaged, and their expected effects;
- elaborate, through a participatory approach, an alternative and examplative scenario of the future of the concerned territory.

2. Contribution to the first citizens workshop at the European level (23-24 April 2010)

2.1. Providing a clear overview of the Case Study problematics

A power point presentation (attached) was delivered to the citizens during the first day of the workshop.

It stressed the following points:

- the dynamic nature of the functioning of the coastal ecosystem
- the notion of coastal zone watershed: the functioning and quality of the coastal zone depends on all human activities in the vast area drained by the rivers which discharge into the sea.
- the distinction between point (urban) and diffuse (agricultural) sources of pollutants
- the lack of ad-hoc measures planned in the scope of the current water management policies to solve the eutrophication problem.

2.2. Identification of the key questions

Consequently, the key questions identified through the discussions with the citizens were:

- On the watersheds: How to establish a solidarity link between upstream activities (in the watersheds) and their ultimate downstream consequences (at the coastal zone)?
- On point sources: Is the ongoing policy, mainly focused on improving wastewater treatment (generalized very efficient tertiary treatment), sustainable and justified?
- On diffuse pollution from agriculture: given that currently envisaged measures will not be sufficient to solve the problem, which alternative actions can be proposed?
- On the coastal zone: How the eutrophication will affect the biological ressources and especially the subsistence of the traditional coastal fisheries ?

3. Contribution to the first Policy and Stakeholder Advisory Group meeting (27 April)

1a. Which are the most urgent policy gaps/constraints/problems to be addressed with respect to water management in your case study region?

A severe alteration of the functioning of the coastal North Sea ecosystem (namely revealed by foam accumulation on the beaches) results from an excess riverine input of nitrogen and phosphorus from the Seine, the Somme and the Scheldt watersheds.
The international OSPAR Commission for the Greater North Sea has set clear objectives for the reduction of these inputs as detailed in the OSPAR strategy to combat Eutrophication.
The European Water Framework Directive prescribes the restoration of the Good Ecological Status of freshwater and littoral water bodies at the 2015 horizon, as did the EU Marine strategy Directive for 2021 for European marine waters.
However, model simulations testing the different nutrient reduction measures planned by France and Belgium (The Water Agencies in France and regional environmental authorities in Belgium) for the implementation of these recommendations clearly suggest that the chosen measures will not reach the assigned goal in term of algal bloom reduction.

1b. Identify the main gaps/constraints in the science-policy linkage with respect to these problems?

Most measures are taken without exploring before their relevance with respect to the damage. In the North Sea case study the planned measures are mostly focused on reducing urban point sources of nutrients, while the major problem is linked to the diffuse sources (mainly nitrogen) from agriculture, which the implementation of the "good agricultural practices" are just able to maintain the enrichment level with no significant reduction.
Much more radical changes in the agricultural practices, in the landscape management, etc., seem therefore required, which are very difficult to implement because of this implies a profound change of society which is far beyond a simple measure.

2a. Currently, what type of participatory mechanisms/approaches are used to in water management in your region to address the water problems? Give some examples.

Information and participation of the public in decisions related to water resources management is included in the text of the European Water Framework Directive. Large public consultation campaigns have been organized in all hydrographical districts. Also, in the French districts, a Basin Committee, composed of elected representatives of local collectivities, acts as a Water Parliament regarding all measures related to water resources.
For example, when large and long terms interdisciplinary programmes are initiated (cf. The PIREN-Seine programme), scientists and engineers can learn a same language, listen each other, and together elaborate research programmes, beneficial for both sides.

2b. If yes, how do they function and which are good or bad experiences with these mechanisms? (Legal and institutional support? Budgetary support etc. available from the government side)

The questions related to the diffuse pollution from the agricultural sector, as opposed to those pertaining urban wastewater management, are difficult to deal with in these forums, because they often transcend the frame of their strict mandate, and because of the long distance (in space and time) between the effects (the coastal zone) and the cause (the land use). As a whole, it should be recognized that none of these participatory mechanisms have resulted in any creative and efficient proposal for solving the eutrophication problem.

2c. If no, can you give some likely reasons/main constraints as to why these approaches are lacking or are not efficient?

Whereas participatory mechanisms are nowadays currently observed between scientists and managers and decisions maker e.g. Water Agencies or other public authorities) through long terms interdisciplinary programmes, such as the PIREN-Seine programme since 1989, the involvement of scientists in the large public consultation campaigns was weak. The message from the research, often very technical, is probably difficult to share with both the public and the executive organizations.

3. How do you plan to overcome the main constraints to participatory mechanisms/approaches in your case study design and implementation?

While scientists might be able to assess the environmental effects of planned measures or profound changes in human activities, the elaboration of alternative scenarios is up to the citizens and their democratic representatives. The process proposed in the AWARE project can be viewed as a prototype of such a participatory approach.

4. Case study local participation process

4.1. Key aspects for all the local case studies' performers

- The local process is an element of the EU aware process.
- Our aim is to put the citizens in a position where they will be able to draft a declaration at local level and a declaration at European level, this one being fed by the local level declaration.
- The declaration that will be drafted at the end of the local workshop will be the input for the local public conference.
- Risks to be avoided in the local process include:
  - Dissociation of the local and EU processes
  - Being "lost" in details during the local process, and addressing "interesting" points that will not be relevant for the success of our project.

  - Having local workshops and final conferences very different in their structure and content, which would reduce the coherence of the project, even if it is important to make sure that the local specificities will be taken into account.
  - Too much dispersion during the exchanges with the stakeholders and policy-makers, which would reduce the capacity of the citizens to draft their declaration.
- Key recommendations:
  - Follow one common framework for the local workshops and local conferences in the 3 parallel case studies (as all the citizens of AWARE group will have to follow a similar experience in this respect).
  - Focus the work on the topic of AWARE: improving the management of the ecosystems with better connectivity, in particular the involvement of the citizens.
- The expected outcomes are 3 different local declarations, taking into account the specificities of the local areas, but following a common framework to:
  - address key issues with scientists and policy makers & stakeholders,
  - give their views for priority scenarios, give their assessment of the connectivity and recommendations

4.2.2 Draft of the stakeholder invitation letter

Madame,
Monsieur,

*Dans le cadre d'un programme Européen AWARE, nous participons (Sisyphe-UPMC et ESA-ULB) à un processus de science participative sur le cas d'étude *"Seine-Somme-Escaut et leur Zone côtière adjacente*", retenu avec deux autres (Delta du Pô et Golfe de Riga). C'est bien sûr grâce surtout aux programmes PIREN-Seine (http://www.sisyphe.upmc.fr/piren/), Seine-Aval (http://seine-aval.crihan.fr/web/), et Timothy (Belspo, Bruxelles), auxquels nous participons à l'UPMC et/ou à l'ULB que la Seine, et l'Escaut, mais aussi la Sommes s'intègrent dans ce processus.*
En votre qualité de « partie prenante », nous serions ravis que vous puissiez participer à ce projet AWARE (http://www.aware-eu.net/) en vous intégrant au débat scientifique avec des citoyens et les scientifiques.

Une telle participation se fera en _trois étapes_, les réunions auront toujours lieu du vendredi matin au samedi après-midi et les frais de missions sont pris en charge par le programme:

*Une première réunion aura lieu *début Octobre*, les 8 et 9. A l'issue de cette première réunion, au cours de laquelle les principaux enjeux auront été discutés, faisant converger les différents points de vue sur de nouveaux scénarios à tester ou/et de nouvelles actions à mener, une seconde réunion sera organisée *fin novembre-début décembre* avec le public, en plus de l'association des citoyens/partie prenantes/scientifiques du cas d'étude Seine/Somme/Escaut & Manche-Mer du Nord.*

*Une autre réunion sera ensuite organisée en *mai 2011* en regroupant l'ensemble les groupes de travail des 3 études de cas.*

En raison du cadre européen de ce projet et des discussions finales qui auront lieu à l'échelle des 3 sites, il est recommandé d'avoir un niveau minimum en anglais qui permette juste de comprendre et se faire comprendre.

Ces débats sont facilités grâce à l'intervention de spécialistes de Missions Publiques (/consultants spécialisés dans l'accompagnement des autorités publiques, de leurs administrations et des opérateurs de services publics)/, impliqués dans le projet AWARE.

Cette démarche itérative et intégrative est destinée à élaborer, surveiller, évaluer et déterminer en commun d'un commun accord les politiques de gestions. Pour les trois cas d'études, malgré leurs spécificités respectives, il s'agit au total de résoudre les problèmes d'eutrophisation côtière en lien avec les activités humaines sur les bassins versant.

Nous espérons que cette initiative et cette expérience retiendra votre intérêt et nous vous adressons nos meilleures salutations.

4.2.3 Questionnaire of the on-line survey

1. *Please let us know to which of the following groups you belong:*
2. *What is your perception of the eutrophicated status of the Southern North Sea coastal water ecosystem? Please rate on a scale of 1 (very poor) to 5 (very good)*
3. *Has the eutrophicated status improved / worsened in the past five years? If the eutrophicated status has improved / worsened, what are the main causes, in your opinion? Who are the main sectors responsible (industry, agriculture, households, …)*
4. *What can the following actors do to improve or protect the eutrophicated status of the coastal water ecosystem?*
5. *To what extent does cooperation between the following actors currently occur? Please rate the quality of cooperation using a scale of 1 (very poor) to 5 (very good)*
6. *Please describe in a few words an example of science, policy, and public cooperation:*
7. *Please check the main causes of the environmental degradation of coastal waters, in your opinion:*
8. *To what extent does eutrophication affect biological resources including the subsistence of local fisheries?*

4.3. Local citizens and stakeholders workshop

The local workshop for the North Sea case study will take place on the 8th and 9th of October 2010. The exact place still needs to be determined.

The local workshop will be organised around the following schedule:

- Morning day 1: from now to short term 2015/mid term 2030/long term 2050

What is the local situation concerning the coastal water ecosystem and its management? (in all dimensions)

- Presentation of the situation with scientific inputs from the local partners
- Which is the “good ecological status” for our case study? How far are we from it?
- The citizens need to understand the future of the situation.

Presentation of the national strategy (at national or transnational level if relevant) to reach the “good ecological status”

How confident are we that the short/mid/long term objectives will be reached or not?

How does the connectivity works and could be improved?

Feedbacks from the local online survey, especially regarding “connectivity”.

- Afternoon day 1: What if… Round-tables on different options/scenarios with the participation of relevant stakeholders and decision-makers

- 2 round-tables

What are the options/scenarios to reach the WFD goals of “good ecological status” by 2015? What if…

The citizens need to understand the path, the way to reach the objectives in the future and the impact of each scenario/option.

Discussion between citizens, scientists (with their inputs from already studied scenarios) and stakeholders (including decision makers)

Social changes will be taken into consideration.

Potential impact of better connectivity, in particular with the citizens

- Morning day 2 : What if … (continuing)

- 1 – 2 round table(s)

- Afternoon day 2 : Citizens’ work

They will prepare their assessment regarding the local coastal water ecosystem and its management, especially regarding connectivity.

They will also prepare guidelines on scenarios on which they give priority to reach the goals.

4.4. Local public conference

The local NS citizen conference will be held in November or December 2010. The Dunkerke Agglomeration Council has offered to host it. It will involve:

- Introduction by the local host
- Presentation of the project and the local case study
- Presentation of the contribution of the citizens
- Presentation of new results (from the scientists)
- Reaction from stakeholders (to be prepared with them) during a round-table
- Discussion
- Closing of the day, and presentation of the AWARE process and next meeting.

4.5. Second EU citizens workshop (April 2011)

The results of the local participatory process will be reported back to the European citizens group, with the support of a case study report. This report will include the views of the participants (citizens, scientists, stakeholders and policy makers) emerged from the local participatory process, and should be co-produced by the local partners with the local members of the AWARE panel. Ideally, it should include a first set of recommendations from the case study that will be discussed, compared with the other case studies and as appropriate harmonized into a final set of recommendations from the whole AWARE citizens group.